



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/784,982 | 02/25/2004 | Shigeru Yao | 054160-5012-03 | 8957 |
| 9629 | 7590 | 10/17/2005 | EXAMINER | |
| MORGAN LEWIS & BOCKIUS LLP 1111 PENNSYLVANIA AVENUE NW WASHINGTON, DC 20004 | | | VO, HAI | |
| | | ART UNIT | | PAPER NUMBER |
| | | 1771 | | |

DATE MAILED: 10/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) |
|------------------------------|------------------------|---------------------|
| | 10/784,982 | YAO ET AL. |
| | Examiner | Art Unit |
| | Hai Vo | 1771 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 25 February 2004.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 15-31 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 15-31 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 25 February 2004 is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. 09/539,929.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 0225.
4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ .
5) Notice of Informal Patent Application (PTO-152)
6) Other: ____ .

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 15, and 18-30 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Tomioka et al (US 5,510,395). Tomioka teaches a porous polymimide film laminated to a metal wire (column 9, lines 55-60). Tomioka teaches the porous film having a porosity of 2% to 70%, a thickness from 5 to 100 microns, a dielectric constant of 2.3 and a pore size of 0.05 to 5 microns within the claimed ranges (column 10, lines 1, and 30-33, table 2, example 9). Tomioka teaches the porous film made from a film casting method. Additionally, Tomioka discloses that the porous film can be used as a gas separation film or a liquid separation film (column 10, lines 15-17). Likewise, the continuous pore structure should be inherently present for success filtration. Tomioka does not specifically disclose the heat shrinkage, gas permeability. Tomika discloses the film

having a gas permeability from 0.1 to 0.7 cm³/cm².sec.cmHg (column 10, lines 15-17). Tomioka teaches a porous film comprised of a polyimide having a formula as shown at column 5, lines 50-60. The formula indicates that the polyimide resin film obtained from the combination of biphenyltetracarboxylic dianhydride component and a diaminodiphenylether component. However, it appears that Tomioka uses the same casting technique to form the porous film which has the thickness, void volume, dielectric constant and pore size within the claimed ranges. The porous film of Tomioka is found useful as a dielectric layer for semiconductor devices as the porous film of the present invention. Hence, it is not seen that the porous film could have the heat shrinkage, gas permeability different from that of the present invention so as to achieve all listed physical characteristics and to be suitable as the dielectric layer for semiconductor devices. Accordingly, the heat shrinkage, and gas permeability would be inherently present. Therefore, it is the examiner's position that Tomioka anticipates or strongly suggests the claimed subject matter.

4. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomioka et al (US 5,510,395) as applied to claim 15 above, in view of Adamopoulos et al (US 5,326,643). Tomioka does not specifically disclose the substrate is laminated on an opposite side of the porous film from the metal layer. Adamopoulos, however, discloses a semiconductor device comprising a laminate of a metal layer, a dielectric polyimide layer and a substrate together bonded to each other via an adhesive layer (abstract, figure 1). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the

multilayer article with a layer construction as described by Adampolous because such is obvious and known in the semiconductor art and Adamopoulos provides necessary details to practice the invention of Tomioka.

5. Claims 15-29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Neill et al (US 6,187,248) in view of Adamopoulos et al (US 5,326,643). O'Neill teaches a nanoporous polymimide film useful as a dielectric layer for semiconductor devices (column 3, lines 45-55). O'Neill teaches the porous film having a thickness less than 10 microns overlapping with the claimed range (column 4, 50-51). O'Neill teaches the porous film having a pore size of less than 0.03 microns, void volume of 54% and dielectric constant of 1.93 as shown in table 1. O'Neill teaches the porous film made from a film casting method. O'Neill does not specifically disclose the heat shrinkage, gas permeability and continuous pore structure. However, It appears that O'Neill uses the same casting technique to form the porous film which has the thickness, void volume, dielectric constant and pore size within the claimed ranges. The porous film of O'Neill is found useful as a dielectric layer for semiconductor devices as the porous film of the present invention. Additionally, the continuous pore structure is dictated by the pore size, void volume and dielectric constant. The porous film of O'Neill apparently achieves all these physical characteristics. Hence, it is not seen that the porous film could have the heat shrinkage, gas permeability and continuous pore structure different from that of the present invention so as to achieve all listed physical characteristics and to be suitable as the dielectric layer for semiconductor devices. Accordingly, the heat

shrinkage, gas permeability and continuous pore structure would be inherently present. O'Neill does not specifically disclose the conductive metal layer is laminated on one side of the porous film. Adamopoulos, however, discloses a semiconductor device comprising a laminate of a metal layer, a dielectric polyimide layer and a substrate together bonded to each other via an adhesive layer (abstract, figure 1). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the multilayer article with a layer construction as described by Adamopoulos because such is obvious and known in the semiconductor art and Adamopoulos provides necessary details to practice the invention of O'Neill.

6. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over O'Neill et al (US 6,187,248) in view of Adamopoulos et al (US 5,326,643) as applied to claim 15 above, further in view of Gilleo et al (US 5,153,303). O'Neill does not specifically disclose the polyimide formed from a biphenyltetracarboxylic acid and para-phenylene diamine. Jasne, however, teaches the polyimide film suitable as a dielectric layer for semiconductor devices can be made from a biphenyltetracarboxylic acid and para-phenylene diamine (column 13, lines 53-55). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the polyimide film from a biphenyltetracarboxylic acid and para-phenylene diamine because it is well known in the polymer art to make thermally stable all aromatic polyimides by the condensation polymerization of dianhydrides and diamines.

Double Patenting

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. Claims 15-31 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 15-27 of U.S. Patent Application No. 10/785,413 in view of Adamopoulos et al (US 5,326,643). The difference between the claims of U.S. Patent Application No. 10/785,413 and the present invention is the presence of the conductive metal layer on at least one side of the porous insulating film. Adamopoulos, however, discloses a semiconductor device comprising a laminate of a metal layer, a dielectric polyimide layer and a substrate together bonded to each other via an adhesive layer (abstract, figure 1). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the multilayer article with a layer construction as described by Adamopoulos because such is obvious and known in the semiconductor art and Adamopoulos provides necessary details to practice the invention of U.S. Patent Application No. 10/785,413.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai Vo whose telephone number is (571) 272-1485. The examiner can normally be reached on M,T,Th, F, 7:00-4:30 and on alternating Wednesdays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571) 272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HV

Hai Vo

**HAI VO
PRIMARY EXAMINER**